

Claims

1. Device for taking liquid or gaseous samples from first containers (1) and/or tubes that are filled with a medium (2), in particular from fermenters, by means of negative pressure, wherein an element (5) which acts as a non-return valve is arranged within a sample probe (3) as an inlet for the sample that is to be taken, characterized in that a supply line (6) which is able to convey gas and a discharge line (7) which is able to discharge sample are arranged on the side of the element (5) that is remote from the medium (2) arranged in the first container (1).
2. Device according to Claim 1, characterized in that the supply line (6) which is able to convey gas and the discharge line (7) which is able to discharge sample are in each case connected to a second container (3a) which receives the sample.
3. Device according to Claim 1, characterized in that the element (5) is arranged within a line arrangement between the supply and discharge lines (6, 7).
4. Device according to one of Claims 1 to 3, characterized in that the supply line (6) which is able to convey gas and the discharge line (7) are designed in such a way that they are suitable for supplying and discharging gases at positive pressure to and from the element (5) which acts as a non-return valve.
5. Device according to Claim 4, characterized in that the element (5) which acts as a non-return valve is designed in such a way that it can be closed automatically by means of the supply of gas at positive pressure.
6. Device according to one of the preceding claims, characterized in that the discharge line (7) is connected to a device (8) for generating the negative pressure.
7. Device according to one of the preceding claims, characterized in that the supply line (6) and the discharge line (7) are arranged within the first container (1) and at least partially have a sheathing (3b) for temperature control and/or cooling of the lines (6, 7).
8. Device according to Claim 7, characterized by a heating device for temperature control or a cooling device for cooling of the supply line (6) and of the discharge line (7) inside the sheathing (3b).

9. Device according to one of the preceding claims, characterized in that the supply line (6) which is able to convey gas is connected to a first gas-conveying connecting line for joining the supply line (6) to a gas supply connection (15).
10. Device according to Claim 9, characterized in that a first and second valve (11, 14) are arranged in the region of the first and second end of the connecting line.
11. Device according to Claim 9 or 10, characterized in that a pressure sensor (13) is arranged in the gas-conveying connecting line.
12. Device according to one of Claims 9 to 11, characterized in that a first sterile filter (12) is arranged in the gas-conveying connecting line.
13. Device according to one of the preceding claims, characterized in that the supply and discharge lines (6, 7) are designed in such a way that they are suitable for supplying and discharging rinsing fluids to and from the element (5).
14. Device according to Claim 13, characterized in that the supply line (6) can be connected to a second connecting line (17) which conveys rinsing fluid.
15. Device according to Claim 14, characterized in that the connecting line (17) which conveys rinsing fluid is connected to a third container (18) which contains a rinsing fluid (19).
16. Device according to one of Claims 13 to 15, characterized in that, for the purposes of pressure equalization, the third container (18) is connected to a further gas supply connection (23) via a further gas-conveying connecting line (20) with a further sterile filter (26) arranged therein.
17. Device according to one of Claims 13 to 16, characterized in that the third container (18) is additionally connected to a rinsing fluid supply connection (22) via a further connecting line (20) which conveys rinsing fluid with a further sterile filter (21) arranged therein.
18. Method for taking liquid or gaseous samples from containers (1) and/or tubes that are filled with a medium (2), in particular from fermenters, by means of negative pressure, wherein an element (5) which acts as a non-return valve is arranged within a

sample probe (3) as an inlet for the sample that is to be taken, characterized by the following steps:

- supplying a gas to the element (5) which acts as a non-return valve on the side of the element (5) that is remote from the medium (2) arranged in the container (1), by means of a supply line (6) that can be shut off from other lines,
- discharging the gas from the element (5) which acts as a non-return valve by means of a discharge line (7) and opening a device (8) which is arranged in the discharge line (7) and which acts as a shut-off valve, until the supply and discharge lines (6, 7) are free of sample,
- closing at least one valve (11) in order to disconnect the supply line (6) from a gas supply connection (15),
- generating in the discharge line (7) a negative pressure with respect to the pressure that exists in the container (1),
- automatically opening the element (5) by means of the negative pressure that has been generated and conveying a sample that is to be taken from the container (1) into the discharge line (7),
- supplying a gas which is again supplied at positive pressure with respect to the pressure that exists in the container (1),
- automatically closing the element (5) by means of the positive pressure that has been generated, and
- conveying the sample out of the discharge line (7) by means of the gas which has again been supplied at positive pressure.

19. Method according to Claim 18, characterized in that, in order to prevent any blockages and adhesions within the discharge line (7) that are caused by ingredients of the sample, a rinsing fluid (19) is supplied via the supply line (6) and discharged via the discharge line (7) after the step of conveying the sample out of the discharge line (7).

20. Method according to Claim 19, characterized in that, after the step of supplying and discharging the rinsing fluid (19), the steps of supplying and discharging the gas are repeated.